

WHAT IS CLAIMED IS:

1. A casting method for casting a cast product having a desired shape, comprising the steps of:

5 using a molding die having a cavity, a sprue from which a molten metal is poured and a feeder head portion arranged between the sprue and the cavity, the molding die being formed so that a difference of heat insulation is partially provided between the feeder head portion and the cavity such that the molten metal filled in the cavity and the feeder head portion  
10 is sequentially solidified in a direction of from a terminal portion of the cavity to the feeder head portion;

pouring the molten metal into the cavity of the molding die;

reducing an oxide film formed on a surface of the molten  
15 metal by allowing the molten metal and a reducing compound to be contacted with each other in the cavity of the molding die; and

solidifying the molten metal filled in the cavity,  
whereby at least a part of the molten metal filled in  
20 the feeder head portion is replenished in the cavity, when a void is formed by shrinkage at the time of the solidifying step.

2. The casting method as set forth in claim 1, wherein the cavity of the molding die comprises a narrow portion  
25 arranged halfway between a feeder head portion side inlet

thereof which is connected with the feeder head portion and the terminal portion thereof and having a smaller cross-sectional area than the terminal portion;

wherein the feeder head portion and the narrow portion are formed such as to have a higher heat insulating property than the terminal portion.

3. The casting method as set forth in claim 2, wherein a part of the molding die defining the feeder head portion is formed by a material that has a higher heat insulating property than a material defining the terminal portion of the cavity.

4. The casting method as set forth in claim 2, wherein a part of the molding die defining the narrow portion of the cavity is formed by a material that has a higher heat insulating property than a material defining the terminal portion of the cavity.

5. The casting method as set forth in claim 2, further comprising the step of:

performing a heat insulating treatment on an inner wall surface of at least one of the feeder head portion and the narrow portion of the cavity by applying a heat insulating coating agent thereto, the heat insulating coating agent being non-reactive to a reducing compound which contacts the molten

metal,

wherein an inner wall surface of the terminal portion of the cavity is free from the heat insulating treatment.

6. The molding method as set forth in claim 1, wherein a part of the molding die defining the feeder head portion is constructed such as to be detachable from a cavity portion of the molding die.

7. The casting method as set forth in claim 1, wherein a part of the molding die defining the feeder head portion forms a molten metal-introducing passage that introduces the molten metal into the feeder head portion, and an introducing passage that introduces raw materials of the reducing compound into the cavity such that the reducing compound is generated in the cavity.

8. The casting method as set forth in claim 1, wherein molten metal of aluminum or an alloy thereof is used as the molten metal, and

wherein a magnesium-nitrogen compound which is obtained by allowing a magnesium gas and a nitrogen gas as raw materials to be reacted with each other is used as the reducing compound.

9. The casting method as set forth in claim 1, wherein

in the solidifying step, a difference of a cooling rate between the molten metal filled in the feeder head portion and the molten metal filled in the terminal portion of the cavity is set to be 200°C/min or more.

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10. A casting apparatus for performing a casting while an oxide film formed on a surface of a molten metal is reduced by allowing the molten metal and a reducing compound to be contacted with each other, comprising:

10 a molding die having a cavity for receiving the molten metal, a sprue from which the molten metal is poured and a feeder head portion arranged between the sprue and the cavity,

wherein a difference of heat insulation is partially provided between the feeder head portion and the cavity such  
15 that the molten metal filled in the cavity and the feeder head portion is sequentially solidified in a direction of from a terminal portion of the cavity to the feeder head portion.

11. The casting apparatus as set forth in claim 10,  
20 wherein the cavity of the molding die comprises a narrow portion arranged halfway between a feeder head portion side inlet thereof which is connected with the feeder head portion and the terminal portion thereof and having a smaller cross-sectional area than the terminal portion;

25 wherein the feeder head portion and the narrow portion

are formed such as to have a higher heat insulating property than the terminal portion.

12. The casting apparatus as set forth in Claim 11,  
5 wherein a part of the molding die defining the feeder head portion is formed by a material that has a higher heat insulating property than a material defining the terminal portion of the cavity.

10 13. The casting apparatus as set forth in claim 11, wherein a part of the molding die defining the narrow portion of the cavity is formed by a material that has a higher heat insulating property than a material defining the terminal portion of the cavity.

15 14. The casting apparatus as set forth in claim 11, wherein an inner wall surface of at least one of the feeder head portion and the narrow portion of the cavity is subjected to a heat insulating treatment by applying a heat insulating  
20 coating agent thereto, and

wherein a surface of an inner wall of the terminal portion of the cavity is free from the heat insulating treatment.

15. The casting apparatus as set forth in claim 14,  
25 wherein the heat insulating coating agent is non-reactive to

a reducing compound which contacts the molten metal poured in the cavity.

16. The casting apparatus as set forth in claim 10,  
5 wherein a part of the molding die defining the feeder head portion is constructed such as to be detachable from a cavity portion of the molding die.

17. The casting apparatus as set forth in claim 10,  
10 wherein a part of the molding die defining the feeder head portion forms a molten metal-introducing passage that introduces the molten metal into the feeder head portion, and an introducing passage that introduces raw materials of the reducing compound into the cavity such that the reducing  
15 compound is generated in the cavity.

18. The casting apparatus as set forth in claim 10,  
wherein the molding die is formed such that a difference of a cooling rate between the molten metal filled in the feeder  
20 head portion and the molten metal filled in the terminal portion of the cavity at the time of solidification of the molten metal is set to be 200°C/min or more.